developing said neural tube defect, Down's Syndrome, or cardiovascular disease in said embryo or said fetus, wherein said polymorphism comprises

- (a) a G instead of an A at position 66 relative to the first nucleotide of the start codon of MTRR,
- (b) a G instead of an A at position 110 relative to the first nucleotide of the start codon of MTRR,
- (c) a deletion of 4 nucleotides starting from position 1675 (nucleotides 1675-1678) relative to the first nucleotide of the start codon of MTRR, or
- (d) a deletion of 3 nucleotides starting from nucleotide 1726 (nucleotides 1726-1728) relative to the first nucleotide of the start codon of MTRR.
- 7. (Amended) The method of claim 6 or 35, wherein said polymorphic MTRR is detected by analyzing nucleic acid from said test subject.
 - 8. The method of claim 7, wherein said nucleic acid is genomic DNA.
 - 9. The method of claim 7, wherein said nucleic acid is cDNA.
- 10. The method of claim 7, wherein said nucleic acid contains a G instead of an A at the third position of the twenty-second codon (nucleotide position 66, relative to the first nucleotide of the start codon) of MTRR.
 - 11. The method of claim 7, said method further comprising:
- a) PCR-amplifying a segment of MTRR nucleic acid using primers MSG108S (SEQ ID NO: 49) and AD292 (SEQ ID NO: 50), and
- b) digesting the product of the PCR amplification reaction with the restriction enzyme *Nde* I, wherein a PCR product that is digested by *Nde* I indicates an increased risk of developing a neural tube defect in a mammalian embryo or fetus.

- 13. The method of claim 6, wherein said test subject is a future female parent of said embryo or said fetus.
 - 14. The method of claim 6, wherein said test subject is said embryo or said fetus.
- 21. The method of claim 6 or 35, wherein said cardiovascular disease is premature coronary artery disease.
- 35. A method for detecting an increased risk of Down's Syndrome, hyperhomocysteinemia, cardiovascular, or cancer in a mammal, said method comprising detecting the presence of a homozygous MTRR polymorphism that indicates an increased risk of Down's Syndrome, hyperhomocysteinemia, cardiovascular, or cancer in said mammal, wherein said polymorphism comprises
- (a) a G instead of an A at position 66 relative to the first nucleotide of the start codon of MTRR,
- (b) a G instead of an A at position 110 relative to the first nucleotide of the start codon of MTRR,
- (c) a deletion of 4 nucleotides starting from position 1675 (nucleotides 1675-1678) relative to the first nucleotide of the start codon of MTRR, or
- (d) a deletion of 3 nucleotides starting from nucleotide 1726 (nucleotides 1726-1728) relative to the first nucleotide of the start codon of MTRR.
 - 36. The method of claim 6, wherein said test subject is human.
 - 37. The method of claim 35, wherein said mammal is human.
- 38. The method of claim 6, further comprising measuring the level of cobalamin in said test subject.

- 39. The method of claim 35, further comprising measuring the level of cobalamin in said mammal.
- 40. The method of claim 6, wherein said polymorphism comprises a G instead of an A at position 66 of MTRR.
- 41. The method of claim 35, wherein said polymorphism comprises a G instead of an A at position 66 of MTRR.

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